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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/792,146 | 03/02/2004 | Anantha Ramaiah | 50325-0872 | 4864 |

29989 7590 10/19/2005

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EXAMINER

KIM, JUNG W

ART UNIT PAPER NUMBER

2132

DATE MAILED: 10/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-------------------------------|--------------------------------|--|
| Office Action Summary | Application No. 10/792,146 | Applicant(s) RAMAIAH ET AL. | |
| | Examiner Jung W. Kim | Art Unit 2132 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>12/04</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

1. Claims 1-17 are pending.

Information Disclosure Statement

2. The items listed on the information disclosure statement filed on December 4, 2004 have been considered.

Specification

3. The disclosure is objected to because of the following informalities: on pg. 4, replace "Ser. No. NNN" with --Ser. No. 10/755,146--. Appropriate correction is required.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 17 is not limited to tangible embodiments. In view of Applicant's disclosure, specification page 14, 2nd full paragraph, the medium is not limited to tangible embodiments (e.g., main memory) and intangible embodiments (e.g. light waves). As such, the claim is not limited to statutory subject matter and is therefore rejected under 35 U.S.C. 101.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peterson et al. Computer Networks, Chapters 2 and 5, "Sliding Window" and "Sliding Window Revisited" (hereinafter Peterson).

8. As per claims 1 and 6, Peterson discloses a sliding window as implemented in TCP, whereby a window size is established between the sender and receiver, the sender maintains a buffer beginning with the last byte acknowledged (LBA) and ending

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with the last byte sent (LBS) (pg. 384, fig. 5.8, "sending application") (technically, the last byte written is the end of the buffer, however this has to do with how the sender writes bytes into the buffer and not how the sliding window operates in concert with the receiver buffer; see also, pg. 106, fig. 2.22), and the receiver maintains a buffer beginning with the next byte expected (NBE) and the last byte received (LBR) (pg. 384, fig. 5.8, "receiving application") (technically, the last byte read is the beginning of the buffer, however this has to do with how the receiver reads bytes from the buffer and not how the sliding window operates in concert with the sender buffer; see also, pg. 107, fig. 2.23). Both buffers represent the windows of the respective endpoints that slide from a lower sequence number (number of bytes received previously) to a higher sequence number (number of bytes received currently) as bytes of segments are received and acknowledged. The windows also have the property of ignoring bytes received outside of the sequence number range (the window) because it is assumed that a received segment either has been read or the received segment has a sequence number too high to be stored by the buffer at that time (pg. 385, 1st paragraph; pgs. 385-387, "Flow Control"). Hence, Peterson discloses receiving a TCP segment carrying an ACK value; determining whether the ACK value is within the advertised window; and discarding the TCP segment when the ACK value is not within the advertised window.

9. Moreover, the claim 1 limitation of:

- i. determining whether the ACK value is less than the difference of a next unacknowledged sequence value and a lesser of either (a) a total

number of bytes sent in the TCP connection or (b) a maximum window size associated with the TCP connection; and

ii. discarding the TCP segment when the ACK value is less than the difference of a next unacknowledged sequence value and the lesser of either (a) the total number of bytes sent in the TCP connection or (b) a maximum window size associated with the TCP connection

10. is equivalent to:

iii. determining whether the $ACK < (\text{next unacknowledged sequence value} - \min(\text{unacknowledged sequence number} - \text{initial sequence number}, \text{max window size}))$; and

iv. discarding the TCP segment when $ACK < (\text{next unacknowledged sequence value} - \min(\text{unacknowledged sequence number} - \text{initial sequence number}, \text{max window size}))$ (see Figure 2, reference no. 204),

11. which is equivalent to:

v. determining whether the $ACK < \min(\text{initial sequence number}, \text{lower bound of the window assuming next unacknowledged sequence value is the upper bound})$; and

vi. discarding the TCP segment when $ACK < \min(\text{initial sequence number}, \text{lower bound of the window assuming next unacknowledged sequence value is the upper bound})$,

12. which defines a determining step where a TCP segment is dropped if the ACK for the segment is less than the initial sequence number or outside of the current window

for the receiver. It would be obvious to one of ordinary skill in the art at the time the invention was made to drop a TCP segment if the ACK is less than the initial sequence number since the segment is not a part of the original transmission. One would be motivated to do so to maintain the order of the bytes received as necessitated by the sliding window algorithm (Peterson, pg. 383, 2nd paragraph). It would be further obvious to one of ordinary skill in the art at the time the invention was made to discard a TCP segment if the ACK is less than the lower bound of the window assuming the next unacknowledged sequence value is the upper bound to prevent overflowing the receiver's buffer (Peterson, pg. 385, "Flow Control"). The aforementioned cover the limitations of claims 1 and 6.

13. As per claim 2, the rejections of claims 1 and 6 under 35 U.S.C. 103(a) are incorporated herein. (supra) In addition, the steps are performed by an endpoint node acting as the receiver of data in the TCP connection (pg. 384, 2nd paragraph).

14. As per claim 3, the rejections of claims 1 and 6 under 35 U.S.C. 103(a) are incorporated herein. (supra) In addition, the steps are performed by a TCP application of an operating system of a network infrastructure element (pg. 384, 2nd paragraph).

15. As per claim 4, the rejections of claims 1 and 6 under 35 U.S.C. 103(a) are incorporated herein. (supra) In addition, the steps are performed by a TCP process,

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stack, adapter or agent hosted by or associated with an operating system of a personal computer, workstation or other network end station (pg. 384, 2nd paragraph).

16. As per claim 5, the rejections of claims 1 and 6 under 35 U.S.C. 103(a) are incorporated herein. (supra) In addition, the maximum window size comprises a maximum TCP sequence value window size that an endpoint node in the TCP connection can manage without regard to any change in current window size that either endpoint may establish during the TCP connection (pg. 385, "AdvertisedWindow").

17. Claims 7-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peterson in view of Zuk et al. US Application publication no 2003/0154399 (hereinafter Zuk).

18. As per claims 7 and 9, the rejections of claims 1 and 6 under 35 U.S.C. 103(a) are incorporated herein. (supra) In addition, in sliding window, when a first TCP segment carrying a sequence value is received, it is determined whether the sequence value is equal to the next expected sequence value so that NBE is incremented to a new next byte expected, which is the received sequence value + the number of bytes of the received segment. Peterson does not teach discarding the one or more second TCP segments from the re-assembly buffer when the first TCP segment overlaps any data segment previously received in the re-assembly buffer. Zuk discloses a TCP reassembly software module that reorders TCP packets that arrive out of order, which

also discards TCP packets when an overlap is identified (pg. 5, paragraph 50, last sentence). This feature has the property of maintaining the consistency and ordering of a packet flow. Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to discard TCP packets when an overlap is identified in the sliding window for TCP since it maintains the consistency and ordering of a packet flow. Furthermore, it would be obvious to one of ordinary skill in the art at the time the invention was made to discarding the one or more second TCP segments from the re-assembly buffer when the first TCP segment overlaps any data segment previously received in the re-assembly buffer, since the first segment is continuous with the previous packet flows and the one or more second TCP segments are not. One would be motivated to do so since it enables the buffer window to shift and allow segments with higher sequence numbers to be stored in the buffer. The aforementioned cover the limitations of claims 7 and 9.

19. As per claim 8, the rejections of claims 7 and 9 under 35 U.S.C. 103(a) are incorporated herein. (supra) Neither Peterson nor Zuk expressly disclose the discarding step discarding all TCP segments that are in the re-assembly buffer. However, the step of removing all the segments is obvious to one of ordinary skill in the art at the time the invention was made because when an overlap is identified between the sequence values in the buffer and the sequence value of the received segment, there is an inconsistency with the received values and the buffered values: the

resubmission of all these buffered values ensures the best means of maintaining a consistent flow. The aforementioned cover the limitations of claim 8.

20. As per claim 10, the rejections of claims 7 and 9 under 35 U.S.C. 103(a) are incorporated herein. (supra) In addition, the discarding step is performed when the first TCP segment completely overlaps any data segment previously received in the re-assembly buffer (discarding step is performed when the first TCP segment overlaps any portion of a data segment previously perceived in the re-assembly buffer, *ibid*).

21. As per claim 11, the rejections of claims 7 and 9 under 35 U.S.C. 103(a) are incorporated herein. (supra) In addition, the method further comprising the step of sending an acknowledgement message that acknowledges data the sequence values of the first TCP segment (inherent feature of sliding window; pgs. 112-114, especially pg. 114, "send ACK").

22. As per claim 12, the rejections of claims 7 and 9 under 35 U.S.C. 103(a) are incorporated herein. (supra) In addition, the steps are performed by an endpoint node acting as the receiver of data in the TCP connection (pg. 384, 2nd paragraph).

23. As per claim 13, the rejections of claims 7 and 9 under 35 U.S.C. 103(a) are incorporated herein. (supra) In addition, the steps are performed by a TCP application of an operating system of a network infrastructure element (pg. 384, 2nd paragraph).

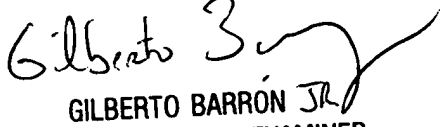
24. As per claim 14, the rejections of claims 7 and 9 under 35 U.S.C. 103(a) are incorporated herein. (supra) In addition, the steps are performed by a TCP process, stack, adapter or agent hosted by or associated with an operating system of a personal computer, workstation or other network end station (pg. 384, 2nd paragraph).

25. As per claims 15-17, they are claims corresponding to claims 1-14, and they do not teach or define above the information claimed in claims 1-14. Therefore, claims 16-17 are rejected as being unpatentable over Peterson in view of Zuk for the same reasons set forth in the rejections of claims 1-14.

Communications Inquiry

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jung W. Kim whose telephone number is 571-272-3804. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gilberto Barron can be reached on 571-272-3799. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


GILBERTO BARRÓN JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100

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October 14, 2005

Jung W Kim
Examiner
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